REMARKS

These remarks are submitted in response to the Office Action dated October 31, 2007 (hereinafter Office Action). This response is filed concurrently with a request for a two-month extension of time and a Request for Continued Examination (RCE). The Office is authorized to charge all fees to Deposit Account No. 50-0951.

I. Claim Rejections under 35 USC §103(a)

Claims 1-4, 6, 7, 11, and 12 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Published Patent Application 2004/0039520 to Khavakh, *et al.* (hereinafter Khavakh), in view of U.S. Patent No. 6,038,559 to Ashby, *et al.* (hereinafter Ashby). Claim 9 was rejected under 35 U.S.C. §103(a) as being unpatentable over Khavakh in view of Ashby. Claim 10 was rejected under 35 U.S.C. §103(a) as being unpatentable over Khavakh in view of Ashby, and in further view of U.S. Patent No. 5,170,353 to Verstraete (hereinafter Verstraete). Claims 13 and 14 were rejected under 35 U.S.C. §103(a) as being unpatentable over Khavakh, in view of Ashby, and in further view of U.S. Patent No. 5,610,821 to Gazis, *et al.* (hereinafter Gazis).

Khavakh teaches a rank suppression system in a navigation algorithm. Rank suppression after a certain threshold is a well-known step in such algorithm in order to speed up the graph development. Khavakh discloses several rank suppression methods, but Khavakh's methods are all different from the specific rank suppression method of the present application.

Analysis of Paragraph 139 of Khavakh

Khavakh discloses a predefined threshold (see paragraph [0139]) used to stop the growing of the inbound graph and start the growing of the outbound graph. This threshold is defined at the end of Khavakh paragraph 139; the threshold can be:

- a predefined distance from the destination waypoint,
- a number of search iterations,
- the travel time from the destination waypoint,
- the number of gates,
- the cost from the destination waypoint or some other definable value.

The threshold defined in Khavakh paragraph 139 is not based on the rank of the segments and, more specifically, not based on the number of segments of the graph developed of a lowest rank m_{inf} as claimed in the present invention.

The threshold of Khavakh paragraph 139 has nothing to do with rank suppression. The threshold only determines when the development of the inbound graph has to stop.

Analysis of Khavakh paragraphs 153 and 164

Khavakh paragraphs 153 and 154 describe how to implement a rank suppression. According to Khavakh paragraph 153, "segment data records having a rank below a certain threshold are suppressed during a portion of the route calculation process." Thus, Khavakh paragraph 153 only describes the principle and the advantages of rank suppression. How is such a threshold determined? Khavakh does not describe how to implement such a rank suppression.

According to Khavakh paragraph 154, "the rank suppression uses predetermined criteria to specify under which conditions rank suppression applies." What are the *predetermined criteria?* There is no clue as to how one skilled in the art implements a rank suppression in Khavakh paragraph 154.

Finally, in Khavakh paragraph 155, the rank suppression requires configurable parameters which are listed below:

(a) the distance (of the gate) from the origin waypoint (for the inbound search tree);

(b) the distance from the destination waypoint (for the outbound search tree);

(c) the distance from the gate of the outbound tree that is closest to the destination waypoint;

(d) the distance from the gate of the inbound tree that is closest to the origin waypoint;

(e) the density of the road network (which may be measured by the rate of the geographical growth of the search tree);

(f) the total number of nodes expanded in the search tree; and

(g) the highest rank of the gate in the inbound tree (this only applies for the outbound tree).

Only the parameter (g) is related to a rank. First, this parameter is only relevant for the outbound tree. Secondly, only the highest rank is relevant as a parameter. This is in contradiction with the present application, in which the segments of the **lowest** rank are taken into account.

Khavakh does not disclose a threshold based on the number of segments of the graph developed of a lowest rank m_{inf} is.

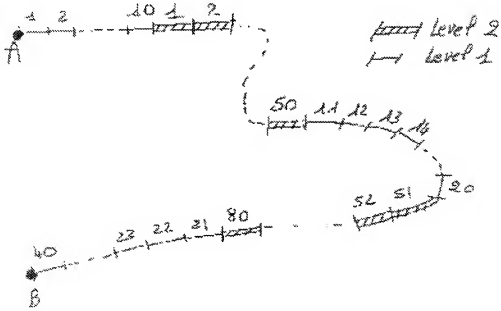
The parameter (f) relates to the total number of nodes expanded in the search tree. However, it fails to teach a threshold for the total number of nodes expanded for each rank.

The examiner is right when he says that Khavakh describes a rank suppression but it does not describe the very specific rank suppression of the present application. Applicant will present an example of search tree in order to fully show the differences between the two rank suppression methods.

Moreover, claim 1 has been amended in order to emphasis the differences with Khavakh. In the present application, there is a succession of rank suppressions (page 12, lines 9-23). Each time a threshold is reached, another one is used to limit the development of the graph.

Comparison of rank suppression methods

For example, a driver has to go from point A to point B using simple road segments of rank 1 and highway segments of rank 2. In the drawing below, a group of highway segments (numbered 1-50) is connected, by simple road segments (numbered 11-20), to another group of highway segments (numbered 51-80).



In a first example, the rank suppression of Khavakh is activated according to parameter (g). As soon as the algorithm reaches the highway segment 1, the algorithm of Khavakh will never select the road segment 11 of rank 1, because this road segment has a smaller rank than the one of the highway. In Khavakh, there is no way back in the rank selection. Khavakh fails to find the best route.

By contrast, the present application has a threshold by rank which allows taking into account the segments of a lower rank. For a threshold of level 1 (S 1=15), the algorithm of the present application allows finding the best route.

In a second example, the rank suppression of Khavakh is activated according to parameter (f), the rank suppression is activated after having expanded 55 gates. The algorithm of Khavakh will never select the road segment 11 of rank 1 because it requires selecting 60 segments (50 segments of rank 2 + 10 segments of rank 1= 60>55). Khavakh, again, fails to find the best route.

By contrast, for a same threshold S1=55 in the present application, the rank suppression is not activated because the algorithm makes the difference between the rank of the segments (Number of segments of rank 2=50; Number of segments of rank 1=10(<55)). The algorithm of the present application allows finding the best route.

According to the present invention, there is a threshold for each rank (see the thresholds Sl, S2 on page 12, lines 9-23). Thus, even if a road segment of rank 4 is selected, it is still possible to select a road segment of rank 1 if the threshold S1 has not been reached. Therefore, the algorithm of the present application can find the optimal route between point A and point B according to the present application.

As explained in the present application, "if the number of segments of level one of the two graphs does not reach the threshold Si, the development block develops the two graphs by taking into account the three levels, even if the number of segments of level one of the other graph reaches and exceeds the threshold Si."

The rank suppression of the present application is flexible and allows covering the majority of the routes without too much computation.

In brief, a threshold for each rank is not disclosed by the paragraphs cited in the Office Action.

It will be shown in the next part that the aggregation of segments in combination with the specific rank suppression allows a far better road computation which could not have been anticipated by one skilled in the art by combining the teaching of Khavakh and Ashby.

Ashby teaches a geographic database for use with a navigation application program using aggregations of segments of roads.

Ashby teaches grouping segments but does not teach substituting a group of successive segments of level m by a single segment of level m. According to Ashby (lines 9-32, column 34), segments are **represented** by an aggregated segment. The term "substitution" is not mentioned. A representation has nothing to do with a substitution.

In Ashby, the aggregated segments represent internal nodes (lines 8-11, column 17), which means that the common segments (linked by internal nodes) are still represented within the aggregated segment.

In the present application, the common segments do not exist anymore. It is a true substitution and not a juxtaposition or representation.

Inventiveness of the substitution of segments in the present application

In the present application, the rank suppression is based on a threshold for each road rank and, therefore, **very dependent on the rank of each road segment.** Substituting a group of segments by a single segment has huge consequences on the algorithm.

Hence the rank suppression is dependent on a threshold, which is itself dependent on the rank of the segments. The substitution of a many segments by a single one allows the threshold to be reached later in the development of the graph.

On one hand, the number of segments which has to be taken in account is limited. On the other hand, it allows decreasing the value of the threshold for each rank, enhancing the calculation speed.

Starting from Khavakh, one skilled in the art knows how to suppress road segments after a certain rank. When he looks at Ashby, he is taught to group segments of a given rank. What does it change in the Khavak's algorithm?

The rank suppression of Khavakh is not based on rank-dependent thresholds. Therefore, grouping segments of the same level is of no help for Khavakh. It does not matter that the grouped segments have the same level in Khavakh.

In the present application, **for each rank,** the segments of the same rank may be grouped, and **for each rank** the number of segments developed is calculated and compared to a "rank" threshold.

One skilled in the art cannot come to the invention because:

the threshold of Khavakh is global and not rank dependent;

Khavakh does not teach a threshold for each rank; and

grouping segments by rank is of no use because it has no incidence on the manner to reach the threshold in Khavakh.

Accordingly, none of the references, alone or in combination, teach or suggest each of the features recited in the claims. Applicants, therefore, respectfully submit that the claims define over the art and request that the rejections be withdrawn.

CONCLUSION

Applicants believe that this application is now in full condition for allowance, which action is respectfully requested. Applicants request that the Examiner call the undersigned if clarification is needed on any matter within this Amendment, or if the Examiner believes a telephone interview would expedite the prosecution of the subject application to completion.

Respectfully submitted,

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